AMENDMENTS

(the Japanese Law § 11 based on PCT § 34(2)(b))

To : Examiner of the Patent Office, Mr. Yusuke TAKAHASHI

1. Identification of the International Application
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4. Item to be amended
Description and claims

5. Subject matter of amendments
(1) As per the attached sheet, we amended by adding the below mentioned new paragraphs after the phrase "it is preferable that... has a thickness equal to or larger than the skin depth ..." on page 16 lines 11 to 12 of the original specification (page 16 lines 24 to 26 of the translated specification). The new paragraphs to be added are: " Furthermore, an image heating device according to a ninth configuration of the present invention includes a heat-generating member comprising a rotatable body having conductivity, and an exciting coil arranged in opposition to the outer peripheral surface of the heat-generating member and adapted for allowing the heat-generating member to generate heat with electromagnetic induction; wherein the exciting coil is composed of a bundle of wires having an insulated surface, which are

extended in the direction of the rotation axis of the heat-generating member and circumferentially wound along the circumferential direction of the heat-generating member, and the bundled wires extending in the direction of the rotation axis of the heat-generating member are arranged in close contact with each other in at least one place.

Furthermore, an image heating device according to a tenth configuration of the present invention includes: a heat-generating member comprising a rotatable body having conductivity, and an exciting coil arranged in opposition to the outer peripheral surface of the heat-generating member and adapted for allowing the heat-generating member to generate heat with electromagnetic induction; wherein the exciting coil composed of a bundle of wires having an insulated surface, which are extended in the direction of the rotation axis of the heat-generating member and circumferentially wound along the circumferential direction of the heat-generating member, and a larger number of bundled wires are superimposed at both ends than at the central portion in the direction of the rotation axis of the heat-generating member.

Furthermore, an image heating device according to an eleventh configuration of the present invention includes: a heat-generating member comprising a rotatable body having conductivity, and an exciting coil arranged in opposition to the outer peripheral surface of the heat-generating member and adapted for allowing the heat-generating member to generate heat with electromagnetic induction; further comprising a core made of magnetic material arranged outside the exciting coil, and the length of the core along the direction of the rotation axis of the heat-generating member is not shorter than the width of a recording material having the maximum width of all the recording materials to be used."

(2) As per the attached sheet, we added claims 42 to 44 after claim 41.

6. List of attached documents

New sheets for pages 16, 16/1 of the specification (pages 16, 16/1 of translated specification): 1 copy each

New sheets for pages 69 and 69/1 of claims (pages 70 and 71/1 of translated specification): 1 copy each

temperature, almost all of the induced current can be generated inside the heat-generating roller.

Furthermore, an image heating device according to an eighth configuration of the present invention includes a fixing belt; a pressure means that is pressed against the fixing belt to form a nip portion on the right side of the fixing belt; a heat-generating roller made of magnetic material whose Curie temperature is set to be a predetermined value and movably suspending the fixing belt; a conductive member provided inside the heat-generating roller; and an exciting coil arranged in opposition to the peripheral surface of the heat-generating roller via the fixing belt and adapted for allowing the heat-generating roller to generate heat by exciting the portion where the heat-generating roller is in contact with the fixing belt. According to the eight configuration of the image heating device, since heat is generated at the portion where the heat-generating roller is in contact with the fixing belt, and the heat is conducted to the fixing belt immediately, it is not necessary to raise the temperature of the heat-generating roller more than necessary. As a result, the warm-up time can be shortened.

Furthermore, in the eighth configuration of the image heating device according to the present invention, it is preferable that the conductive member is arranged adiabatically with respect to the heat-generating roller. With such a preferred configuration, heat generated at the heat-generating roller is not conducted to the conductive member easily.

Furthermore, in the eighth configuration of the image heating device according to the present invention, it is preferable that an exciting current having a predetermined frequency is applied to the exciting coil, and the heat-generating roller has a thickness equal to or larger than the skin depth defined by the material thereof and the predetermined frequency.

Furthermore, an image heating device according to a ninth configuration of the present invention includes a heat-generating member comprising a rotatable body having conductivity, and an exciting coil arranged in opposition to the outer peripheral surface of the heat-generating member and adapted for allowing the heat-generating member to generate heat with electromagnetic induction; wherein the exciting coil is composed of a bundle of wires having an insulated surface, which are extended in the direction of the rotation axis of the heat-generating member and circumferentially wound along the circumferential direction of the heat-generating member, and the bundled wires extending in the direction of the rotation axis of the heat-

generating member are arranged in close contact with each other in at least one place.

Furthermore, an image heating device according to a tenth configuration of the present invention includes: a heat-generating member comprising a rotatable body having conductivity, and an exciting coil arranged in opposition to the outer peripheral surface of the heat-generating member and adapted for allowing the heat-generating member to generate heat with electromagnetic induction; wherein the exciting coil composed of a bundle of wires having an insulated surface, which are extended in the direction of the rotation axis of the heat-generating member and circumferentially wound along the circumferential direction of the heat-generating member, and a larger number of bundled wires are superimposed at both ends than at the central portion in the direction of the rotation axis of the heat-generating member.

Furthermore, an image heating device according to an eleventh configuration of the present invention includes: a heat-generating member comprising a rotatable body having conductivity, and an exciting coil arranged in opposition to the outer peripheral surface of the heat-generating member and adapted for allowing the heat-generating member to generate heat with electromagnetic induction; further comprising a core made of magnetic material arranged outside the exciting coil, and the length of the core along the direction of the rotation axis of the heat-generating member is not shorter than the width of a recording material having the maximum width of all the recording materials to be used.

Furthermore, an image forming apparatus according to the present invention includes an image forming means for forming an unfixed image onto a recording material and having the unfixed image carried thereon; and a fixing device for fixing the unfixed image onto the recording material, wherein an image heating device according to the present invention is used as the fixing device.

Brief Description of Drawings

Figure 1 is a cross-sectional view showing a fixing device as an image heating device according to a first embodiment of the present invention;

37. The image heating device according to claim 34, wherein an exciting current having a predetermined frequency is applied to the exciting coil, and the conductive member of the heat-generating roller has a thickness equal to or larger than the skin depth defined by the material thereof and the predetermined frequency.

38. An image heating device comprising:

a fixing belt;

a pressure means that is pressed against the fixing belt to form a nip portion on the right side of the fixing belt,

a heat-generating roller made of magnetic material whose Curie temperature is set to be a predetermined value and movably suspending the fixing belt;

a conductive member provided inside the heat-generating roller; and

an exciting coil arranged in opposition to the peripheral surface of the heat-generating roller via the fixing belt and adapted for allowing the heat-generating roller to generate heat by exciting the portion where the heat-generating roller is in contact with the fixing belt.

39. The image heating device according to claim 38, wherein the conductive member is arranged adiabatically with respect to the heat-generating roller.

40. The image heating device according to claim 38, wherein an exciting current having a predetermined frequency is applied to the exciting coil, and the heat-generating roller has a thickness equal to or larger than the skin depth defined by the material thereof and the predetermined frequency.

41. An image forming apparatus comprising:

an image forming means for forming an unfixed image onto a recording material and having the unfixed image carried thereon; and

a fixing device for fixing the unfixed image onto the recording material,

wherein an image heating device according to any one of claims 1 to 40 is used as the fixing device.

42 (added) An image heating device comprising:

a heat-generating member comprising a rotatable body having conductivity, and

an exciting coil arranged in opposition to the outer peripheral surface of the heat-generating member and adapted for allowing the heat-generating member to generate heat with electromagnetic induction;

wherein the exciting coil is composed of a bundle of wires having an insulated surface, which are extended in the direction of the rotation axis of the heat-generating member and circumferentially wound along the circumferential direction of the heat-generating member, and the bundled wires extending in the direction of the rotation axis of the heat-generating member are arranged in close contact with each other in at least one place.

43 (added) An image heating device comprising:

a heat-generating member comprising a rotatable body having conductivity, and

an exciting coil arranged in opposition to the outer peripheral surface of the heat-generating member and adapted for allowing the heat-generating member to generate heat with electromagnetic induction;

wherein the exciting coil composed of a bundle of wires having an insulated surface, which are extended in the direction of the rotation axis of the heat-generating member and circumferentially wound along the circumferential direction of the heat-generating member, and a larger number of bundled wires are superimposed at both ends than at the central portion in the direction of the rotation axis of the heat-generating member.

44. (added) An image heating device comprising:

a heat-generating member comprising a rotatable body having conductivity, and

an exciting coil arranged in opposition to the outer peripheral surface of the heat-generating member and adapted for allowing the heat-generating member to generate heat with electromagnetic induction;

further comprising a core made of magnetic material arranged outside the exciting coil, and the length of the core along the direction of the rotation axis of the heat-generating member is not shorter than the width of a recording material having the maximum width of all the recording materials to be used.